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EXAMINER

LEUNG, JENNIFER A

ART UNIT

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/795,972	<b>Applicant(s)</b> JACKSON ET AL.	
	<b>Examiner</b> JENNIFER A. LEUNG	<b>Art Unit</b> 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 07 January 2008 and 28 September 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |



## **DETAILED ACTION**

### ***Response to Amendment***

1. Applicant's amendments submitted on September 28, 2007 and January 7, 2008 have been carefully considered. The changes made to the Specification on January 7, 2008 are acceptable. Claims 1-10 are under consideration.

### ***Response to Arguments***

2. Applicant's arguments filed September 28, 2007 and January 7, 2008 have been fully considered but they are not persuasive. Applicant (see third paragraph of remarks) argues that,

“Unlike the present invention, the Hinzke reference teaches a hollow column. The hollow column is formed by arranging cylindrical section **18** and **19** one upon the other in an alternating sequence. Hinzke, page 1, lines 105-108. Unlike the present invention, sulphur is not combusted in the hollow column.”

The Examiner respectfully disagrees.

In the Hinzke apparatus, a solid phase sulfur is fed to the melting kettle **28** via feed pipes **42**. During operation, the solid phase sulfur is melted in the kettle **28**, and the melted sulfur is passed from the kettle **28**, through the needle valve orifices **36**, and onto a plurality of trays **21**. The melted sulfur passes in a serpentine fashion from tray to tray, flowing down through the orifices **26** of an upper tray and over the peripheral edge of a successive tray, until the melted sulfur falls upon the floor **5** at the base of the apparatus. As indicated by Hinzke, "the bottom of the burner body or shell... acts as the final burning surface for the melted sulphur," (page 3, lines 1-5). However, it is noted that the combustion of sulfur is not limited to this region of the apparatus. In fact, Hinzke discloses that during the melt and flow of sulfur, hot gases (i.e., inherently comprising vaporized sulfur) will be generated, and the hot gases enter the hollow

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column defined by cylindrical sections **18,19** via openings **17**, at which point the hot gases are "only partly combusted and oxidized" (see page 3, lines 32-43). One having ordinary skill in the art would have recognized the inherent presence of vaporized sulphur in the hot gases, given that prior art apparatuses experienced "sulphur deposits" at the outlet, which tended to decrease the draught (see page 1, lines 18-20).

Hinzke, e.g., discloses (with emphasis added) that,

"When the hot gases enter the oxidizing chamber *such gases are only partly combusted and oxidized*, and it is in this oxidizing chamber formed by the pipe enlargement **51** and the perforated dome **53** that the gases receive their final treatment.

In opening the lower row of port openings **54** which are located beneath the perforated dome **53** enough air is let in, and *the air and gas undergo a thorough mixing in passing through the perforated dome causing the final combustion and oxidation of the gases*.

The upper row of port openings located above the perforated dome are only opened slightly in order to observe the colour of the *flame*." (see page 3, lines 32-43).

"... *the inner chamber formed by the central duct thereby providing ample time for the proper combustion of the gases* which during such process of combustion generate heat for melting the sulphur charge." (see page 3, lines 65-68).

"... *the burning gases forming a central core* surrounded by the inflowing air— by my device this air is thoroughly intermixed with the gases so as to produce *thorough combustion* as hereinbefore referred to," (see page 3, lines 99-104).

Contrary to Applicant's assertion, sulphur (i.e., in the form of a sulphur vapor) would be further combusted in the hollow column, given that the vapor is only "partly combusted" when it enters at the base of the column. The instant claims call for "a burn chamber in which to combust sulphur". Thus, the hollow column, which completely combusts and oxidizes the partly combusted and oxidized sulphur vapor, meets the language in the claims.

***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 2 and 5 are rejected under 35 U.S.C. 102(b) as being anticipated by Hinzke (US 1,421,232).

Hinzke (see FIGs. 1-8) discloses an apparatus (i.e., a sulphur burner **1**) comprising: a burn chamber in which to combust sulphur (i.e., the hollow column forming an outlet duct; FIG. 1; see, for example, page 1, line 105 to page 2, line 4), the burn chamber comprising one or more sidewalls (e.g., cylindrical sections **18, 19**; cylindrical member **27**), a base (i.e., the portion of the sulphur burner **1** floor **4/5**, below base **13**), a lid (i.e., dome **53**) and a gas outlet (i.e., the perforations in the dome **53**, which communicate with the outlet pipe **65**); a hopper (i.e., melting kettle **28**) to hold sulphur to be combusted, the hopper comprising one or more sidewalls (i.e., defined by portions **29, 30**), a base (i.e., perforated plate **48**; horizontal wall **35**) and a lid (i.e., defined by the top of portion **29**), wherein the sulphur hopper substantially surrounds the burn chamber; and a housing adjacent the burn chamber to capture the radiant heat of the burn chamber (i.e., defined by the annular region between the peripheral wall **2/3** of the sulphur burner **1** and the hollow column forming the outlet duct, located below the melting kettle **28**). Hinzke further discloses a hatch (i.e., orifice **41**, leading to feed pipe **42**, with cover **43**; page 2, lines 52-59) in the lid of the hopper to permit loading sulphur into the hopper.

Instant claims 1, 2 and 5 structurally read on the apparatus of Hinzke.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over W. D. Jones (US 197,474) in view of Hinzke (US 1,421,232).

W. D. Jones (see FIG. 1) discloses a sulphurous acid generator apparatus comprising: a sulphur burner (i.e., a furnace **H**, in which sulphur is burned) having a gas outlet (i.e. in communication with pipe **I**); a first conduit (i.e., exhaust-pipe **G**) connected to the gas outlet of the sulphur burner for conducting sulphur dioxide gas; a second conduit (i.e., water-injection pipe **D**) for conducting a stream of water; and means (i.e., a cylindrical case **a**, connecting the exhaust-pipe **G**, the water-injection pipe **D**, and an outlet-pipe **E**) for passively introducing the sulphur gases conducted in the first conduit **G** into the stream of water in the second conduit **D**.

W. D. Jones, however, is silent as to the sulphur burner **H** comprising the instantly claimed burn chamber and hopper configuration.

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Hinzke (see FIGs. 1-8) teaches a sulphur burner **1** comprising: a burn chamber in which to combust sulphur (i.e., the hollow column forming an outlet duct; FIG. 1; see, for example, page 1, line 105 to page 2, line 4), the burn chamber comprising one or more sidewalls (e.g., cylindrical sections **18, 19**; cylindrical member **27**), a base (i.e., the portion of the sulphur burner **1** floor **4/5**, below base **13**), a lid (i.e., dome **53**) and a gas outlet (i.e., the perforations in the dome **53**, which communicate with the outlet pipe **65**); and a hopper (i.e., melting kettle **28**) to hold sulphur to be combusted, the hopper comprising one or more sidewalls (i.e., defined by portions **29, 30**), a base (i.e., perforated plate **48**; horizontal wall **35**) and a lid (i.e., defined by the top of portion **29**), wherein the sulphur hopper substantially surrounds the burn chamber.

It would have been obvious for one of ordinary skill in the art at the time the invention was made to substitute the sulphur burner of Hinzke for the sulphur burner **H** in the sulphurous acid generator apparatus of W.D. Jones, on the basis of suitability for the intended use and absent a showing of unexpected results thereof, because the Hinzke sulphur burner eliminates the danger of ignition during the loading of fresh sulphur into the burner (see page 1, lines 34-36; page 3, lines 75-81). Furthermore, the substitution of known equivalent structures involves only ordinary skill in the art. *In re Fout* 213 USPQ 532 (CCPA 1982); *In re Susi* 169 USPQ 423 (CCPA 1971); *In re Siebentritt* 152 USPQ 618 (CCPA 1967); *In re Ruff* 118 USPQ 343 (CCPA 1958). When a claim is directed to a structure already known in the prior art that is altered by the mere substitution of one element for another known in the field, the combination must do more than yield a predictable result.

5. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over W. D. Jones (US 197,474) in view of Hinzke (US 1,421,232), as applied to claim 3 above, and further in view of



Forbush et al. (US 4,526,771).

The collective teaching of W.D. Jones and Hinzke is silent as to the apparatus comprising a means for substantially eliminating any discharge plume (e.g., that may exit via discharge pipe **F**; FIG. 1), by reducing the moisture content of the gases and vapors exiting the apparatus.

Forbush et al. teaches a sulphurous acid generator apparatus, wherein the apparatus comprises a means for substantially eliminating any discharge plume, by reducing the moisture content of the gases and vapors exiting the apparatus (i.e., a demister **87**, for separating liquid from the vapor passing out of the top of the absorption tower **20**; FIGs. 5; column 5, lines 23-29). It would have been obvious for one of ordinary skill in the art at the time the invention was made to provide a means for substantially eliminating any discharge plume exiting from the modified apparatus of W.D. Jones, on basis of suitability for the intended use and absent a showing of unexpected results thereof, because such means would help minimize the passage of entrained liquid from the apparatus and into the atmosphere.

6. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over W. D. Jones (US 197,474) in view of Hinzke (US 1,421,232) and Forbush et al. (US 4,526,771).

The same comments with respect to W.D. Jones, Hinzke and Forbush et al. apply (see comments for claims 3 and 4, above).

7. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jackson (US 6,506,347) in view of Hinzke (US 1,421,232).

Jackson discloses a sulphurous acid generator apparatus comprising: a burn chamber **40** in which to combust sulphur, the burn chamber comprising one or more sidewalls **44**, a base (i.e., floor member **42**), a lid (i.e., roof member **46**) and a gas outlet (i.e., exhaust opening **60**); (see,

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for example, FIGs. 1, 1A, 1B; column 7, lines 20-44); a hopper **20** to hold sulphur to be combusted, the hopper comprising one or more sidewalls (i.e., defined by enclosure **24**), a base **22** and a lid **26**; (see, for example, FIGs. 1, 1A, 1B; column 6, line 64 to column 7, line 19); a first conduit **70** connected to the gas outlet for conducting sulphur dioxide gas (see column 13, lines 1-9); a second conduit **282** for conducting a stream of water (see column 13, lines 10-12); and means for passively introducing the sulphur gases conducted in the first conduit into the stream of water in the second conduit (i.e., a third conduit **76**, comprising co-directional flow means **100**; column 13, lines 13-41).

Jackson, however, is silent as to the burner chamber and hopper having the instantly claimed configuration.

Hinzke (see FIGs. 1-8) teaches a sulphur burner **1** comprising: a burn chamber in which to combust sulphur (i.e., the hollow column forming an outlet duct; FIG. 1; see, for example, page 1, line 105 to page 2, line 4), the burn chamber comprising one or more sidewalls (e.g., cylindrical sections **18, 19**; cylindrical member **27**), a base (i.e., the portion of the sulphur burner **1** floor **4/5**, below base **13**), a lid (i.e., dome **53**) and a gas outlet (i.e., the perforations in the dome **53**, which communicate with the outlet pipe **65**); and a hopper (i.e., melting kettle **28**) to hold sulphur to be combusted, the hopper comprising one or more sidewalls (i.e., defined by portions **29, 30**), a base (i.e., perforated plate **48**; horizontal wall **35**) and a lid (i.e., defined by the top of portion **29**), wherein the sulphur hopper substantially surrounds the burn chamber.

It would have been obvious for one of ordinary skill in the art at the time the invention was made to substitute the sulphur burner of Hinzke for the burn chamber and hopper in the sulphurous acid generator apparatus of Jackson, on the basis of suitability for the intended use

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and absent a showing of unexpected results thereof, because the Hinzke sulphur burner eliminates the danger of ignition during the loading of fresh sulphur into the burner (see page 1, lines 34-36; page 3, lines 75-81). Furthermore, the substitution of known equivalent structures involves only ordinary skill in the art. *In re Fout* 213 USPQ 532 (CCPA 1982); *In re Susi* 169 USPQ 423 (CCPA 1971); *In re Siebentritt* 152 USPQ 618 (CCPA 1967); *In re Ruff* 118 USPQ 343 (CCPA 1958). When a claim is directed to a structure already known in the prior art that is altered by the mere substitution of one element for another known in the field, the combination must do more than yield a predictable result.

8. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jackson (US 6,506,347) in view of Hinzke (US 1,421,232), as applied to claim 3 above, and further in view of Forbush et al. (US 4,526,771).

Jackson is silent as to the apparatus comprising a means for substantially eliminating any discharge plume (e.g., that may exit from the top of tower **265**), by reducing the moisture content of the gases and vapors exiting the apparatus. Forbush et al. teaches a sulphurous acid generator apparatus, wherein the apparatus comprises a means for substantially eliminating any discharge plume, by reducing the moisture content of the gases and vapors exiting the apparatus (i.e., a demister **87**, for separating liquid from the vapor passing out of the top of the absorption tower **20**; FIGs. 5; column 5, lines 23-29). It would have been obvious for one of ordinary skill in the art at the time the invention was made to provide a means for substantially eliminating any discharge plume exiting from the modified apparatus of Jackson, on basis of suitability for the intended use and absent a showing of unexpected results thereof, because such means would help minimize the passage of entrained liquid from the apparatus and into the atmosphere.

9. Claim 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jackson (US 6,506,347) in view of Hinzke (US 1,421,232) and Forbush et al. (US 4,526,771).

The same comments with respect to Jackson, Hinzke and Forbush et al. apply (see comments for claims 3 and 4 above).

10. Claims 6-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hatschek (US 101, 011) in view of Hinzke (US 1,421,232).

Regarding claim 6, Hatschek (FIGs. 1-3) discloses a sulphurous acid generator apparatus, wherein the sulphurous acid generator combusts sulphur (i.e., in pan *f*) creating radiant heat of and about the apparatus, the apparatus generating a discharge of gases and/or vapors into the air (i.e., exiting from column *C* via part *m* of chimney *E*), the apparatus comprising: a sulphur burner for generating sulphur dioxide gas (i.e., in melting chamber *c*); and means for substantially eliminating any discharge plume (i.e., a sleeve *o*, surround chimney portions *d* and *m*; column 2, in the paragraph before the claims). Hatschek, however, is silent as to the sulphur burner comprising the instantly claimed burn chamber and hopper configuration.

Hinzke (see FIGs. 1-8) teaches a sulphur burner **1** comprising: a burn chamber in which to combust sulphur (i.e., the hollow column forming an outlet duct; FIG. 1; see, for example, page 1, line 105 to page 2, line 4), the burn chamber comprising one or more sidewalls (e.g., cylindrical sections **18**, **19**; cylindrical member **27**), a base (i.e., the portion of the sulphur burner **1** floor **4/5**, below base **13**), a lid (i.e., dome **53**) and a gas outlet (i.e., the perforations in the dome **53**, which communicate with the outlet pipe **65**); and a hopper (i.e., melting kettle **28**) to hold sulphur to be combusted, the hopper comprising one or more sidewalls (i.e., defined by portions **29**, **30**), a base (i.e., perforated plate **48**; horizontal wall **35**) and a lid (i.e., defined by

the top of portion **29**), wherein the sulphur hopper substantially surrounds the burn chamber.

It would have been obvious for one of ordinary skill in the art at the time the invention was made to substitute the sulphur burner of Hinzke for the sulphur burner **c** in the sulphurous acid generator apparatus of Hatschek, on the basis of suitability for the intended use thereof, because the Hinzke sulphur burner eliminates the danger of ignition during the loading of fresh sulphur into the burner (see page 1, lines 34-36; page 3, lines 75-81). Furthermore, the substitution of known equivalent structures involves only ordinary skill in the art. *In re Fout* 213 USPQ 532 (CCPA 1982); *In re Susi* 169 USPQ 423 (CCPA 1971); *In re Siebentritt* 152 USPQ 618 (CCPA 1967); *In re Ruff* 118 USPQ 343 (CCPA 1958). When a claim is directed to a structure already known in the prior art that is altered by the mere substitution of one element for another known in the field, the combination must do more than yield a predictable result.

Regarding claims 7-10, Hatschek discloses that the means for substantially eliminating any discharge plume comprises a heated housing through which exiting gases and vapor flow (i.e., sleeve **o**, heated by gases within the chimney part **d**). The radiant heat emitted by the gases in the chimney part **d** will inherently transfer to the cooler gases within the chimney part **m**, which will inherently reduce the moisture content of the discharge by dehumidification.

### ***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re*

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*Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

11. Claims 1-3 and 5 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-8 of U.S. Patent No. 6,506,347 in view of Hinzke (US 1,421,232).

US '347 claims a sulphurous acid generator comprising: a burn chamber in which to combust sulphur (see claims 3, 4, 7, 8); a hopper to hold sulphur to be combusted (see claims 3, 7); a first conduit connected to the gas outlet of the burn chamber for conducting sulphur dioxide gas (see claims 1, 5); a second conduit for conducting a stream of water (see claims 1, 5); and means for passively introducing the sulphur gases conducted in the first conduit into the stream of water in the second conduit (i.e., a third conduit, comprising a blending portion and contact containment portion, where the first and third conduits define an open system; claims 1, 5). US '347, however, is silent as to the burn chamber and hopper comprising the claimed configuration.

Hinzke (see FIGs. 1-8) teaches a sulphur burner **1** comprising: a burn chamber in which to combust sulphur (i.e., the hollow column forming an outlet duct; FIG. 1; see, for example, page 1, line 105 to page 2, line 4), the burn chamber comprising one or more sidewalls (e.g., cylindrical sections **18**, **19**; cylindrical member **27**), a base (i.e., the portion of the sulphur burner **1** floor **4/5**, below base **13**), a lid (i.e., dome **53**) and a gas outlet (i.e., the perforations in the

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dome **53**, which communicate with the outlet pipe **65**); a hopper (i.e., melting kettle **28**) to hold sulphur to be combusted, the hopper comprising one or more sidewalls (i.e., defined by portions **29, 30**), a base (i.e., perforated plate **48**; horizontal wall **35**) and a lid (i.e., defined by the top of portion **29**), wherein the sulphur hopper substantially surrounds the burn chamber (see FIG. 1); a housing adjacent the burn chamber to capture the radiant heat of the burn chamber (i.e., defined by the annular region between the peripheral wall **2/3** of the sulphur burner **1** and the hollow column forming the outlet duct, located below the melting kettle **28**); and a hatch (i.e., orifice **41**, leading to feed pipe **42** and having a hinged cover **43**; page 2, lines 52-59) in the lid **29** of the hopper **28** to permit loading sulphur into the hopper.

It would have been obvious for one of ordinary skill in the art at the time the invention was made to substitute the sulphur burner of Hinzke for the burn chamber and hopper in the sulphurous acid generator apparatus of US '347, on the basis of suitability for the intended use thereof, because the Hinzke sulphur burner eliminates the danger of ignition during the loading of fresh sulphur into the burner (see page 1, lines 34-36; page 3, lines 75-81). Furthermore, the substitution of known equivalent structures involves only ordinary skill in the art. *In re Fout* 213 USPQ 532 (CCPA 1982); *In re Susi* 169 USPQ 423 (CCPA 1971); *In re Siebentritt* 152 USPQ 618 (CCPA 1967); *In re Ruff* 118 USPQ 343 (CCPA 1958). When a claim is directed to a structure already known in the prior art that is altered by the mere substitution of one element for another known in the field, the combination must do more than yield a predictable result.

12. Claim 4 is rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-8 of U.S. Patent No. 6,506,347 in view of Hinzke (US 1,421,232), as applied to claim 3 above, and further in view of Forbush et al. (US 4,526,771).

US '347 is silent as to the apparatus comprising a means for substantially eliminating any discharge plume (e.g., that may exit as exhausted gas from the tower; see claim 2), by reducing the moisture content of the gases and vapors exiting the apparatus. Forbush et al. teaches a sulphurous acid generator, wherein the apparatus comprises a means for substantially eliminating any discharge plume, by reducing the moisture content of the gases and vapors exiting the apparatus (i.e., a demister **87**, for separating liquid from the vapor passing out of the top of the absorption tower **20**; FIGs. 5; column 5, lines 23-29). It would have been obvious for one of ordinary skill in the art at the time the invention was made to provide a means for substantially eliminating any discharge plume in the modified apparatus of US '347, on basis of suitability for the intended use and absent a showing of unexpected results thereof, because such means would minimize the passage of entrained liquid from the apparatus and into the atmosphere.

13. Claims 6 and 7 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-8 of U.S. Patent No. 6,506,347 in view of Hinzke (US 1,421,232) and Forbush et al. (US 4,526,771).

The same comments with respect to US '347, Hinzke and Forbush et al. apply (see comments for claim 3 and 4 above).

14. Claims 1-3 and 5 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-5 of U.S. Patent No. 7,141,220 in view of Hinzke (US 1,421,232).

US '220 claims a sulphurous acid generator comprising: a burn chamber in which to combust sulphur (see claims 3, 4); a hopper to hold sulphur to be combusted (see claim 3); a first conduit connected to the gas outlet of the burn chamber for conducting sulphur dioxide gas (see



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claim 1); a second conduit for conducting a stream of water (see claim 1); and means for passively introducing the sulphur gases conducted in the first conduit into the stream of water in the second conduit (i.e., a third conduit, comprising means for bringing the sulphur dioxide gas and water into contained, codirectional, substantially downward flow, wherein the first and third conduits define an open system; see claim 1). US '220, however, is silent as to the burn chamber and hopper comprising the claimed configuration.

Hinzke (see FIGs. 1-8) teaches a sulphur burner **1** comprising: a burn chamber in which to combust sulphur (i.e., the hollow column forming an outlet duct; FIG. 1; see, for example, page 1, line 105 to page 2, line 4), the burn chamber comprising one or more sidewalls (e.g., cylindrical sections **18, 19**; cylindrical member **27**), a base (i.e., the portion of the sulphur burner **1** floor **4/5**, below base **13**), a lid (i.e., dome **53**) and a gas outlet (i.e., the perforations in the dome **53**, which communicate with the outlet pipe **65**); a hopper (i.e., melting kettle **28**) to hold sulphur to be combusted, the hopper comprising one or more sidewalls (i.e., defined by portions **29, 30**), a base (i.e., perforated plate **48**; horizontal wall **35**) and a lid (i.e., defined by the top of portion **29**), wherein the sulphur hopper substantially surrounds the burn chamber (see FIG. 1); a housing adjacent the burn chamber to capture the radiant heat of the burn chamber (i.e., defined by the annular region between the peripheral wall **2/3** of the sulphur burner **1** and the hollow column forming the outlet duct, located below the melting kettle **28**); and a hatch (i.e., orifice **41**, leading to feed pipe **42** and having a hinged cover **43**; page 2, lines 52-59) in the lid **29** of the hopper **28** to permit loading sulphur into the hopper.

It would have been obvious for one of ordinary skill in the art at the time the invention was made to substitute the sulphur burner of Hinzke for the burn chamber and hopper in the

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sulphurous acid generator apparatus of US '220, on the basis of suitability for the intended use thereof, because the Hinzke sulphur burner eliminates the danger of ignition during the loading of fresh sulphur into the burner (see page 1, lines 34-36; page 3, lines 75-81). Furthermore, the substitution of known equivalent structures involves only ordinary skill in the art. *In re Fout* 213 USPQ 532 (CCPA 1982); *In re Susi* 169 USPQ 423 (CCPA 1971); *In re Siebentritt* 152 USPQ 618 (CCPA 1967); *In re Ruff* 118 USPQ 343 (CCPA 1958). When a claim is directed to a structure already known in the prior art that is altered by the mere substitution of one element for another known in the field, the combination must do more than yield a predictable result.

15. Claim 4 is rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-5 of U.S. Patent No. 7,141,220 in view of Hinzke (US 1,421,232), as applied to claim 3 above, and further in view of Forbush et al. (US 4,526,771).

US '220 is silent as to the apparatus comprising a means for substantially eliminating any discharge plume (e.g., that may exit as exhausted gas from the tower; see claim 2), by reducing the moisture content of the gases and vapors exiting the apparatus. Forbush et al. teaches a sulphurous acid generator, wherein the apparatus comprises a means for substantially eliminating any discharge plume, by reducing the moisture content of the gases and vapors exiting the apparatus (i.e., a demister **87**, for separating liquid from the vapor passing out of the top of the absorption tower **20**; FIGs. 5; column 5, lines 23-29). It would have been obvious for one of ordinary skill in the art at the time the invention was made to provide a means for substantially eliminating any discharge plume in the modified apparatus of US '220, on basis of suitability for the intended use and absent a showing of unexpected results thereof, because such means would help minimize the passage of entrained liquid from the apparatus and into the atmosphere.

16. Claims 6 and 7 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-5 of U.S. Patent No. 7,141,220 in view of Hinzke (US 1,421,232) and Forbush et al. (US 4,526,771).

The same comments with respect to US '220, Hinzke and Forbush et al. apply (see comments for claims 3 and 4 above).

### ***Conclusion***

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: Plank et al. (US 911,328) is cited to illustrate a conventionally known combustion apparatus, having a centrally located burn chamber defined by tube 5.

18. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

\* \* \*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JENNIFER A. LEUNG whose telephone number is (571)272-

1449. The examiner can normally be reached on 9:30 am - 5:30 pm Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jennifer A. Leung/  
Primary Examiner, Art Unit 1797